26 OCTOBER 1979 AND (FOUO 4/79) 1 OF 1

JPRS L/8732

26 October 1979

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

(FOUO 4/79)

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WORLDWIDE REPORT

NUCLEAR DEVELOPMENT AND PROLIFERATION

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CONTENTS PAGE

CONTENTS (Continued) Page

WEST EUROPE

WORLDWIDE AFFAIRS

'FINANCIAL TIMES' DETAILS PAKISTANI NUCLEAR PURCHASES IN UK

London THE FINANCIAL TIMES in English 22 Aug 79 p 2 LD

[Simon Henderson report: "Pakistan's Nuclear Shopping List: The British Link"]

[Excerpts] According to the local guidebook, the town of Kahuta near Islamabad, capital of Pakistan, is a quiet place with a skyline broken by several Sikh and Hindu temples.

There is nothing to suggest, it says, the pre-partition horrors of 1947 when the town was the scene of serious intercommunal fighting between Moslems on one side and Sikhs and Hindus on the other.

What the guidebook fails to mention, however, is that today Kahuta is the site of another serious source of tension between Moslem and Hindu. It is where Pakistan is believed to be building a gas centrifuge uranium enrichment facility capable of producing weapons-grade uranium.

Investigations in Pakistan and Britain show that:

The main conduit for the supply of equipment is a body in Rawalpindi named the Special Works Organisation (SWO). Its function is to procure materials for the manufacture and support of Pakistan's nuclear facilities;

Pakistan's buying of equipment for its nuclear plant has continued despite a British Government ban on the export of some items;

These purchases have been made through two related companies in Swansea and in London.

The orders have links with other purchases made in Europe as part of an operation controlled by a Pakistani scientist who is believed to have acquired secret information from a uranium enrichment plant in Holland.

Pakistan's purchases first came to light last year when Mr. Frank Allaun, chairman of the Labour Party and MP for Salford East, pointed out that equipment known as frequency changers or inverters being made at Emerson Electrical Controls of Swindon for Pakistan could be used with gas centrifuges. The order worth 1.25 million pounds was going through Weargate of Swansea. The British Government banned its export, but Weargate says it has continued to sell other non-restricted goods.

Purchases of other equipment have also been made. Inverters from Emersons were ordered through West Germany for shipment to Pakistan and were delivered before the British Government ban. Rotors for centrifuges were bought elsewhere in Europe. High vacuum valves came from Switzerland, as did gas handling units which were required for vaporising uranium hexafluoride to be processed in the centrifuges.

Although Pakistan's budget allocation for its nuclear programme is only $40 million per year, it is clear that much more is being spent.

The Kahuta building site is spread over hundreds of acres, probably accounting for more than the official nuclear budget by itself. There are residential and other buildings under construction, and a dam with six slipways.

According to diplomats work at Kahuta comes under the Special Works Organisation at 169 Kitson Road, Rawalpindi, the military town next to Islamabad. In July this year the SWO placed notices for tenders in the local press for the transport of 5,000 tons of cement before the end of the year to "work sites 35 km from Rawalpindi," a description which fits Kahuta. The cement alone is worth $450,000.

The Special Works Organisation is the body to which Weargate Ltd. of Swansea says it has sold 800,000 pounds worth of machine tools and other equipment during the last 18 months.

The man in charge of the SWO is Brigadier Anis Ali Syed--an American-trained engineer who was deputy director of military operations in the Pakistan Army until appointed in June last year. He visited Britain from December 4 to 24 last year "on official business."

Other visitors to Britain last year were two retired army officers working for the Pakistan Atomic Energy Commission, Major Mohammed Sadio Malik, and procurement officer and Captain Fida Hussein Shah, an assistant administrative officer.

The two men, who were also travelling to Switzerland, said they were to expedite the delivery from England of machinery and lathes which had been ordered and arranged for its shipment via Pakistan International Airlines.

In response to questions by British officials they said all arrangements had been made by their project director, Dr. Abdul Qadir Khan. They gave the company they were to visit as S. R. International of Clovelly Avenue, London SW.

Dr Khan is the Pakistani scientist who used to work in Holland and is now believed to be in charge of the uranium enrichment programme.

There is no Clovelly Avenue listed in South-West London. The only Clovelly Avenue is in Colindale, London NW9. But when Major Malik returned from a second visit to England in December 1978, he again gave his destination as S. R. International of London SW.

S.R. International of Source Reliance International of Clovelly Avenue, London NW9 operates out of number 27. Its directors are a Mr. and Mrs. Abdus Salam who live next door at number 25. Mr. and Mrs. Salam also own 66 per cent of the Swansea company. Weargate.

Mr. and Mrs. Salam are at present on holiday in America and last week an employee of the company refused to answer any questions about it.

In Pakistan last month a spokesman for the Pakistan Atomic Energy Commission denied that Dr. A.Q. Khan worked there. But there is no doubt of his links with the nuclear research programme.

During a visit to an installation called Engineering Research Laboratory (ERL), at Islamabad Airport in June my colleague, Chris Sherwell, was told that Dr. Khan was a co-director of the establishment.

ERL is believed to be the transit point for nuclear-related equipment flown in from Europe by Pakistan International Airlines. It is now guarded by plainclothes security men. There is also little doubt about the sensitive aspects of Pakistan's projects. The French ambassador to Pakistan and his first secretary were beaten up after driving past Kahuta in June. Chris Sherwell was attacked three days later outside the house of Dr. Khan in Islamabad.

CSO: 5100

WORLDWIDE AFFAIRS

MITI STILL DETERMINED TO IMPORT CANADIAN REACTORS

OW271531 Tokyo MAINICHI DAILY NEWS in English 26 Aug 79 p 5 OW--FOR OFFICIAL USE ONLY

[Text] The Ministry of International Trade and Industry (MITI) has indicated its determination to introduce Canadian-developed nuclear reactors by including two demands concerning its Candu reactor important plan in its fiscal 1980 budget estimate. MITI briefed the Liberal Democratic Party on the budget estimate Friday. When explained by MITI officials to the Commerce and Industry Division of LDP's Policy Affairs Research Council, it was found to include the two demands in defiance of recent disapproval of the Candu import plan by the Atomic Energy Commission.

On Aug 10, the commission had officially decided against MITI's bid pending since 1976, for the reason that it is likely to bring unnecessary confusion into Japan's established national nuclear energy development program.

Based on the idea of steadily switching from the existing American-type light water-cooled and decelerated power reactors to the prospective fast breeder reactors (FBRS), the program calls for the development of Japan's own advanced thermal converter reactor (ATR), an equivalent of the Candu series as a stop-gap type. A pilot model of ATR is already in test operation.

The commission's rejection of MITI's bid reportedly reflected long-standing backstage bureaucratic antagonism between the Science and Technology Agency, whose director general is an ex-officio chairman of the commission, and MITI over the latter's aggressiveness regarding national nuclear energy policy affairs. The agency has been looking on this as disregard of its authority.

MITI thus has refused to accept the commission's decision despite the legal provision that the prime minister must pay full respect to all official decisions of the commission.

But in view of the significant character of MITI's plan, including its close connection with the Japan-Canada economic friendship, the plan as well as the commission's decision is still under consideration among the government and party leaders for an ultimate conclusion.

Against such a delicate background, MITI's new budgetary estimate included a 2.6 billion yen nuclear energy-related demand as part of a 164.3 billion yen appropriation to semigovernmental Electric Power Development Co (EPDC) which had been in charge of the practical phase of MITI's Candu reactor introduction plan. Candu is an acronym for "Canadian Deuterium Uranium," indicating the Canadian series unique heavy water-cooled and decelerated unrefined uranium-using functions.

The 2.6 billion yen demand divides into 800 million yen as expense for testing a Candu reactor model for its safety and performance in Japan and 1.8 billion yen for acquiring land tracts and other needed facilities.

As MITI officials explained, EPDC has been studying the Candu reactor since 1975, holding a series of experiments concerned under a three-year program (fiscal 1978-1980). The 800 million yen demand is the third one in a series, with the preceding two annual demands having been accepted, but the appropriations unused and returned to the national treasury. The 1.8 billion yen demands is not necessarily intended for the Candu reactor plan only.

MITI officials criticized the commission's but explained such budgetary demands are not directly connected with a basic designing expense for introducing a remodelled version of the Candu series matching Japan's need, such as unsuccessfully sought in MITI's preceding annual budgetary estimate.

Meanwhile, the MITI's overall budget demand for fiscal 1980 calls for total appropriations of 719,473 million yen in the general account, up 32.9 percent over the fiscal 1979 budget, and 7,676.8 billion yen in the fiscal loan and investment program, the other half of Japan's two-tier budget system. The MITI officials explained the big increase in the general-account budget was necessary to promote long-range nonoil energy source development.

CSO: 5100

BRIEFS

JAPAN-SEA TECHNOLOGY AID--The government has decided to help developing countries learn about nuclear-related technology to narrow the gap in this area between the advanced nations and the developing world. Nevertheless, the principle of preventing the proliferation of nuclear arms cannot be violated. The government will cooperate only in the utilization of radiation for agricultural purposes. As the first step, the government will accept trainees from nine Southeast Asian countries for a month from 15 Oct. The trainees will stay at the Japan Atomic Energy Research Institute's facility in Takasaki, where they will receive professional training. Japan will cooperate in a joint program to develop techniques of preserving fish. Such techniques are urgently needed by the developing countries, where there are no facilities for freezing fish. [Tokyo ASAHI EVENING NEWS in English 15 Aug 79 p 3 OW]

CSO: 5100

JAPAN

EDITORIALS VIEW ENRICHED URANIUM PRODUCTION

'THE DAILY YOMIURI' 14 Sep

Tokyo THE DAILY YOMIURI in English 14 Sep 79 p 2 OW

[Editorial: "Japan's Nuclear Capability"]

[Text] On Wednesday, Japan became the eighth nation in the world to produce enriched uranium on its own, when the nation's first pilot plant using centrifugal separators went into operation at Ningyozaka, Okayama-ken.

In the past, we had to depend on the U.S. to supply us with enriched uranium. Domestic production will facilitate Japan's efforts to establish a nuclear fuel cycle of its own. It has great political and economic significance.

All countries which produce enriched uranium keep their process secret. Any country which wants to produce enriched uranium has to develop its own process. We congratulate the authorities, the engineers and scientists who developed our own process.

There are, however, many problems to be overcome before the centrifugal separation process can be put to practical use.

First of all, we need to establish a system to make practical use of newly developed techniques. The Atomic Energy Commission has mapped out a plan for a prototype plant which is three times larger than the pilot plant at Ningyozaka. By 1995, the aim is for Japan to produce one-third of the enriched uranium it requires for nuclear power generation.

Cost and Safety Problems

It is said, however, that the cost of producing enriched uranium at Ningyozaka is nearly 10 times higher than international market prices. It is necessary to increase the performance and efficiency of the pilot plant. We must be ready to invest money for this purpose. It is also necessary to make clear who will construct a plant where the new techniques can be put to practical use. Because of the safety problem and other factors, the development of nuclear power plants in the world has been stalled, decreasing the demand for enriched uranium.

It is important to decide to whom nuclear fuel will be supplied. This problem must be studied from many angles. The government must adopt a long-range viewpoint in studying the domestic production of enriched uranium. Also, it is necessary for Japan to make clear that adequate steps will be taken to prevent nuclear proliferation. This is a highly delicate problem.

At a recent meeting of nonaligned countries, the president of Pakistan said his country would push its nuclear development plan. This came as a big shock because Pakistan will be using enriched uranium.

'MAINICHI DAILY NEWS' 15 Sep

Tokyo MAINICHI DAILY NEWS in English 15 Sep 79 p 2 OW

[Editorial: "Uranium Enrichment and Japan"]

[Excerpts] The beginning Wednesday of test production of enriched uranium to fuel power reactors, at a pilot plant in Okayama Prefecture, marks a major milestone in the annals of Japan's nuclear energy development. Japan is the second in the world in number of nuclear power reactors, but it has been totally dependent on the U.S. for the enriched uranium which fuels them. The start of domestic production of enriched uranium, though still in the test phase, can be construed as a significant step toward Japan's independence from the U.S. in securing enriched uranium supplies.

The development of technology for producing enriched uranium utilizing centrifugal separators was designated a national project in 1972, and has since been promoted by the Power Reactor and Nuclear Fuel Development Corp, the builder of the Okayama pilot plant. The plant is equipped with 1,000 separators but the number will increase to 7,000 by the fall of 1981, according to plans, and it is said Japan excels in efficiency of separators.

While we feel the corporation deserves praise for its achievement in producing enriched uranium, we at the same time confront problems, both internationally and domestically, in this connection. The first is the fact that enriched uranium production technology can be utilized for manufacturing deadly nuclear weapons. In this respect, the pilot plant comes under inspection by the International Atomic Energy Agency. But even so, it is important Japan declare anew that it is using atomic energy for purely peaceful purposes.

The biggest and most urgent problem the world faces today is now to promote peaceful uses of atomic energy while preventing the proliferation of nuclear arms. Moves by South Africa and Pakistan toward developing their own nuclear arms, after successfully producing enriched uranium, have frequently been reported. Japan's step to produce its own enriched uranium--for peaceful uses--should not in any way spur those countries to manufacture nuclear weapons.

Uranium enrichment technology, one of the most important of all nuclear technologies, is tightly guarded by those who have it. The strict secrecy is not likely to be lifted under the prevailing circumstances. Japan is now provided with a new "weapon" for use in its "energy diplomacy," with the know-how to produce enriched uranium. But we see the need for Japan to use whatever influence it may acquire to help curb the proliferation of nuclear arms in the world.

The second problem concerns how to commercialize the new uranium enrichment technology. Prospects for a solution to this problem--one of the biggest the country faces in its nuclear energy development efforts--are not necessarily bright at present.

Even if all 7,000 separators are put into operation by 1981, as planned, the amount of enriched uranium expected to be produced annually will be sufficient only to sustain, for less than one year, a reactor with a power output of one million kilowatts. Further, the cost is now several times the current international price.

On balance, Japan's nuclear development technology has just begun to bear fruit. Although this is a matter of delight to us, we have difficult problems such as how to put to practical use Japan's first domestically developed advanced thermal converter reactor (ATR) and recycling facilities for spent nuclear fuel discharged from reactors at Tokai village in Ibaraki Prefecture.

Everything considered, Japan's nuclear energy policy is now at a turning point.

CSO: 5100

JAPAN

EPDC BEING PRESSURED TO AID ATR, FBR DEVELOPMENT

Tokyo THE JAPAN TIMES in English 23 Sep 79 p 13

[Article by Hiroshi Ueda: "'Ulterior Motives' Lurk Behind Officials CANDU Controversy"]

[Text]

The bureaucratic tug of war between the Ministry of International Trade and Industry (MITI) and the Atomic Energy Commission (AEC) over whether Japan should buy a Canadian nuclear reactor is escalating as MITI formally demands that the AEC reverse its earlier decision against the purchase.

Yoshihiko Morozumi, president of the Electric Power Development Co. (EPDC), is a former MITI vice minister and strong advocate of the pressurized heavy water reactor. He left suddenly for Canada last week apparently to talk with Ottawa officials over new purchasing strategies.

And now the controversy threatens to develop into a full-scale "war" involving businessmen and Liberal Democratic Party (LDP) politicians as well as government officials as soon as the Oct. 7 election is over.

But strangely enough, to MITI and EPDC officials, the high efficiency of the CANDU (Canadian deuterium and uranium) reactor, which they have repeatedly stressed on many occasions, is actually of secondary importance.

Likewise, a series of technical problems involved in CANDU, which the commission pointed out in its Aug. 10 report, was not the real reason why it virtually ruled out the years-old plan of the EPDC, a semigovernmental enterprise, to purchase CANDU.

The controversy, which apparently involves "ulterior motives" in various quarters, has already resulted in heated talks. Some LDP members are explicit on where they stand — they suggest that the five-member AEC, which directly advises the prime minister, should be dissolved.

Many industries which have various interests in Canada also oppose the commission. There is a fairly strong possibility of the AEC's decision being eventually reversed.

Rumors circulate that Prime Minister Masayoshi Ohira might overrule the commission shortly after Nov. 15 when the term of office of Susumu Kiyonari, acting ABC chairman, expires.

One of the real reasons why MITI favors the purchase of CANDU relates to its deep-rooted distrust of the AEC — and to AEC's long-term program, adopted in August 1977, to develop an advanced thermal reactor (ATR) and fast breeder reactor (FBR).

The ATR, also a heavy water reactor, consumes plutonium and uranium as fuel, while light water reactors, now popular in this country, spend enriched uranium. The FBR consumes fuels similar to the ATR but offers even better fuel economy because it cyclically proliferates fuels while in operation.

MITI officials believe that, even if the commission's program fails, Japan can meet its growing energy needs in the late 1980s with CANDU.

The Power Reactor and Nuclear Fuel Development Corp. (PNC), also a semigovernmental enterprise, is now operating Japan's first ATR with a capacity of 165,000 kilowatts in Tsuruga, Fukui Prefecture.

However, the test reactor, named Fugen, is still in the initial stages of development. It

will take several more years to develop the ATR for operation on a commercial basis.

For completion of an FBR capable of commercial operation, it is believed an additional 20 to 25 years of research are required.

MITI officials say that there are still many problems regarding commercial ATR operation such as where to find plutonium, heavy water and pressure tubes.

Government sources reveal that the AEC's brief report, which ruled against Japan's purchase of CANDU, is a message to the EPDC asking it to assist in the development of the ATR and FBR.

"The real intention of the report lies," the sources say, "in creating a situation where the EPDC will have no alternative but to undertake such development work."

To cope with possible delays in its own program, according to the sources, the commission hopes to secure the assistance of the EPDC which has a staff of more than 100 nuclear reactor engineers and relatively large research and development funds.

"But we have no intention to take over ATR development before PNC develops an ATR capable of commercial operation," says EPDC President Morozumi.

He stresses that, although the EPDC is partly financed by the government, it is essentially a business enterprise and therefore is cautious about any deal which involves big commercial risks.

"We are ready to purchase and operate CANDU because its commercial operation capabilities have been already proven," he says.

However, he does not rule out the possibility that the EPDC might offer assistance if the commission approves of the CANDU purchase.

"We believe Japan needs CANDU," he says, "not only because it can effectively reinforce the AEC's ATR-development program but because it can be easily converted into a thorium breeder reactor (TBR) if such a need arises due to possible delays in FBR development."

In view of Earth's abundant thorium deposits compared with uranium, Canada plans to develop a TBR capable of commercial operation in 15 years, much faster than the pace of Japan's FBR development.

Morozumi says, "Japan should establish nuclear fuel cycles with both uranium and thorium fuels, and the EPDC is ready to work on a thorium cycle."

Another reason why MITI and EPDC favor the purchase of CANDU, which they are intentionally playing down, is that such a small overseas purchase (a little over ¥200 billion) could go a long way in promoting other commercial ties between Japan and Canada, for example, projected joint oil development in the Arctic Ocean and other resources development projects.

They regard the CANDU purchase merely as one step in obtaining from Canada, concessions in oil, natural gas, oil sand, coal, uranium, copper, lead and pulp, among other resources.

"For Japan, Canada has special significance as a natural resources supplier," MITI officials say, "now that Canada plans to explore for oil in the Arctic Ocean."

Many Japanese industries — including the oil, coal, gas, non-ferrous metals and steel industries as well as trading houses — are vying for concessions from Canada. Industry sources predict that what happened in Indonesia in the early 1970s might happen in Canada soon.

In the early 1970s, keen competition among Japanese firms for Indonesia's liquefied natural gas (LNG) and other resources resulted in some of them invoking the political influence of the then Prime Minister Kakuei Tanaka to attain their goals.

Industry sources say that Japan can expect Canada to favor this country regarding resources development if Japan buys the CANDU reactor.

The AEC and the Science and Technology Agency (STA), are strongly opposed to linking resources problems to the CANDU question. Moritaka Nakamura of the STA's atomic energy bureau stresses the necessity of making a decision on the CANDU purchase from a purely technological viewpoint, saying, "The purchase of CANDU is not a prerequisite for Japan's purchase of Canadian resources."

Even so, problems related to resources attract the attention of LDP members. They question not only the legality of the AEC decision but also the need for such a supreme decision-making organ in determining the nation's nuclear policy.

Zentaro Kosaka, who has in the past served as foreign minister and chairman of LDP's policy affairs research council, believes the commission's decision-making process on the CANDU question infringes on constitutional rights in that it ignores the views of many people.

"I feel there is a need to reform the AEC through revision of the Atomic Energy Commission Law which provides the advisory body with excessive administrative power while exempting it from any responsibility for situations resulting from its decisions," he says.

After the general election next month, Kosaka plans to establish a special committee within the LDP's policy affairs research council to analyze this problem, together with about 20 other LDP members including Takashi Hashiguchi and Kozo Watanabe.

ARGENTINA

NATION'S POTENTIAL AS URANIUM EXPORTER TERMED REALISTIC

Buenos Aires LA OPINION in Spanish 18 Sep 79 p 15

[Article by Martin F. Yriart]

[Text] At the present time, exploitation of Argentine uranium deposits is beginning to acquire a true economic scale and to attract participation by foreign capital and technology. The possible existence of surpluses over the strategic reserves required by the Nuclear Plan is opening up a new prospect like exportation. This involves a careful evaluation of requirements and prospects and the establishment of a strategy that will make it possible to potentiate this resource to the benefit of other fronts in the country's nuclear development.

The proved reserves of uranium that guarantee a self-supply of fuel, at present, for all the nuclear powerplants in the country, including Atucha I (in operation), Embalse (under construction) and the four scheduled by the Nuclear Plan, may become, in a not distant future, a decisive tool for ensuring the obtention of capital and technology for the approaching stages in the country's nuclear development.

Up to the present time, the work of exploration and prospecting by the National Atomic Energy Commission has made it possible to determine the existence of 27,000 metric tons of uranium whose extraction is feasible at a cost of less than $60 a kilogram of uranium contained in the ore. There is probably a volume ten times greater at higher costs and with a lower degree of certainty.

The 27,000 metric tons already proved guarantee a supply for the first six Argentine nuclear powerplants for their entire useful life, estimated at 30 years. This takes the projection well within the next century, because the first of those six powerplants will go in operation in 1982 and the last in 1997.

Meanwhile, nuclear reactor technology will undergo a spectacular development that will probably make uranium technically and economically obsolete in the first or second decade of the next century.

Plutonium reactors are already in the demonstration stage. Their characteristic is the generation of more fuel than they consume. Therefore, they are known as Fast Breeder Reactors (FBR). Although the generation cost of present FBR's is higher than the cost of reactors consuming natural or enriched uranium, it is predicted that, in the future, they will prove to be fully competitive, once their technology has been perfected and the necessary scale has been reached.

An alternate source of fissionable material, suitable for conventionally designed reactors, is thorium, a mineral little known at present but assumed to exist in proportions at least equal to uranium. One property of thorium is that it is not suited for the production of atomic explosives. Therefore, nonproliferation countries, led by the United States, regard it as a more reliable solution for the peaceful development of nuclear energy. If little is known about thorium in the geological-mining aspect, there has been still less development with regard to nucleoelectric technology.

It will take at least two decades for the first commercial thorium reactors to go in operation. But their appearance on the market will also contribute to displacing the demand for uranium.

Finally, by the first decades of the next century, experts are predicting that the technology of controlled nuclear fusion reaction will have been adequately developed. This is regarded as mankind's great energy hope. Fusion reactors use a virtually infinite fuel, hydrogen, and are absolutely "clean" from the point of view of radioactive wastes.

With this outlook, although the installed nucleoelectric generating capacity is multiplied between 1997 and the first decades of the next century, Argentina will have a surplus of uranium that, presumably, will continue to lose strategic value from the economic point of view.

This assumption can be made on the basis of present known or estimated reserves. Nevertheless, Argentina is a vastly underexplored country with regard to its uranium deposits. One indication of this is the amount of linear meters of drilling performed per ton of uranium measured, which, in round numbers, is ten times less than in countries like the United States or Australia. Mining geologists maintain that, up to now, only the surface has been "scratched." In a few years, an increase in exploration to levels similar to the ones reached in other uranium-producing countries may lead to discoveries of a spectacular size. The consensus among experts is that this will very probably happen, although, up to now, the policy of the National Atomic Energy Commission has been to adhere to the most conservative figures, giving as sure values only those with the greatest reliability and lowest cost, in order to prevent detrimental speculation or outside pressure.

Moreover, uranium was declared a strategic mineral in the second half of the decade of the 1940's and its exploitation has been subjected, up to now, to a system of military security. That system has varied, up to the present time, after the Nuclear Plan started, which contemplates, for the first time, the possibility of exporting part of the nation's uranium production, insofar as it does not affect the reserves regarded as necessary for guaranteeing future supplies.

The same objectives of the Nuclear Plan are what have led to a modification of this attitude. In fact, after the first six powerplants, which will be in operation in 1997, a period of massive incorporation of nuclear energy into the public generating system begins. These first six powerplants, the largest of which will have a capacity of 650 megawatts, approximately, represent only an adjustment of the nation's nuclear industry. Starting in 1998, powerplants with a greater capacity are scheduled to go in operation (1,200 megawatts is the next unit up on the scale, but 1,800-megawatt reactors are already on the drawing board).

Within the methodology of the CNEA [National Atomic Energy Commission], these new powerplants require certification of new mineral reserves with a similar degree of reliability and cost as the 27,000 proved reserves at present. This means investments and mining technology on a much higher scale and more effective than what has been available so far. Within a rational economic system, that capital and that technology cannot come, as in the past, from the budget and capability of CNEA. In order to go fully into the "nuclear business" under the same conditions as countries producing uranium at present, Argentina must be equal to the rules of the game on the world market and for this purpose it must also take advantage of the factors offered by this market.

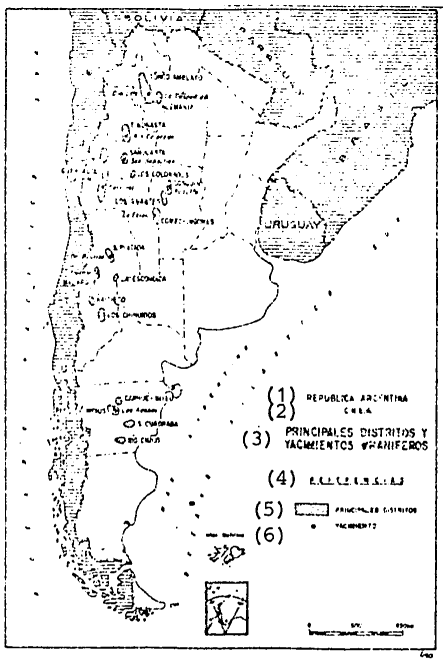
Without giving up its sovereignty or leaving its reserves unprotected, Argentina must open the game, in order to potentiate its uranium resources as much as possible, before their economic and strategic value declines. If the new nucleoelectric technologies are materialized in the terms and time period stated above, the option will certainly be to increase uranium exports. If, on the other hand, fast breeder reactors, thorium and fusion are delayed or prove to be less efficient than what has been anticipated, expansion of the uranium reserves will enable the country to continue to grow with regard to energy and to await development of the new technologies.

The first attempt at participation by foreign capital in uranium mining will take concrete shape this year, because adjudication of the Tigre I deposit, in the Sierra Pinta mining district, Mendoza, is expected before December. Argentine nuclear reactors will be supplied by it during the next 15 years. Two consortia have been preselected and, in accordance with the conditions of their respective bids, in both there are companies with Argentine capital in association with foreign companies with experience in similar mining operations. The specifications contemplate the possibility of exporting part of the product, but they also obligate the awardees to carry out further explorations, in order to guarantee future uranium ore reserves.

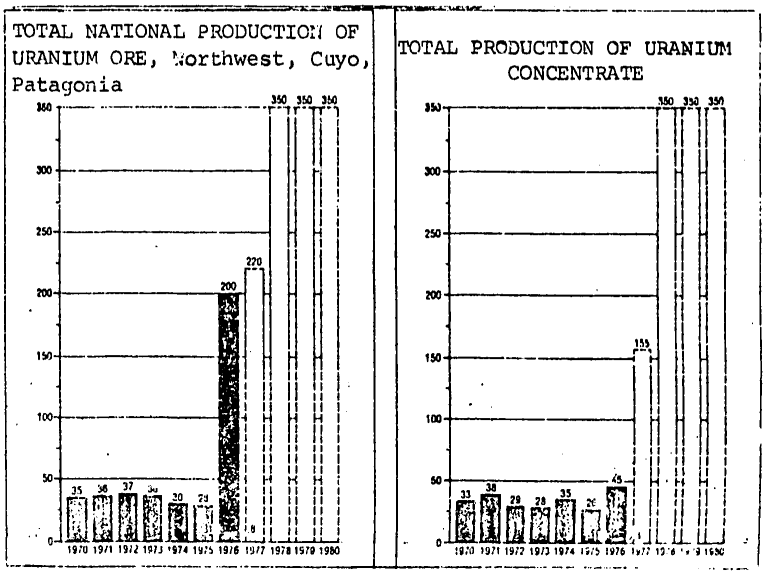
This decision modifying substantially the nation's policy with regard to uranium and which has resulted from a long, thoroughly studied evaluation will bring with it an especially significant corolary. Argentina, as the possessor of sizable exportable reserves, will become a privileged party in talks with nuclear technology exporting countries, which depend to a considerable degree on imports to meet their needs. Although this is a relatively long-term prospect, it is not a rash proposition. Actually, the German-Brazilian agreement is based precisely on the fact that Germany will export to Brazil reactor technology, fuel and exploitation, for which Brazil will pay by exporting ore.

Therefore, for Argentina, increasing its uranium reserves does not merely mean guaranteeing for itself fuel for its present and future reactors, regardless of how important this objective is. It also means a qualitative step toward a position as a full-fledged nuclear country. This position is supplemented by the development of an engineering, construction and assembly capability suitable for reactors and their auxiliary facilities and by know-how for the manufacture of fuel and heavy water.

Uranium mining has a number of points in its favor within the policy of utilizing the relative advantages for guiding economic development toward those sectors in which it is most feasible to achieve an efficiency compatible with the international level.



Key: 1. Argentine Republic; 2. National Atomic Energy Commission; 3. Principal uranium districts and deposits; 4. References; 5. Principal districts; 6. Deposit



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FEDERAL REPUBLIC OF GERMANY

STUDY ON NUCLEAR REACTOR SAFETY PUBLISHED

Reactors Found Safe

Hamburg DER SPIEGEL in German 20 Aug 79 pp 173-174

[Text] The number of nuclear power advocates is increasing again. A "German Reactor Risk Study" appears to support them.

Among the 1,300 nuclear engineers and technicians who assembled last week in the new Berlin Congress Center for the Fifth International Reactor Conference, frustration was widespread. "Many of us are dejected," was how one of them described the mood; "after all, we are completely convinced of our proposals, but the public will not go along."

Yet the uneasiness of the FRG public about the "safest and cleanest type of energy generation," as was stressed again and again in Berlin, is apparently disappearing. Threatened gasoline shortages and increasing heating oil costs have contributed to this. For example, the fraction of convinced nuclear power opponents dropped from 33 percent to 22 percent according to a poll in Hessen between April and July of this year, and the definite supporters increased from 50 percent to 61 percent.

From the viewpoint of the first German "reactor risks study," whose results were made public on Tuesday of last week by Federal Research Minister Volker Hauff, the strength of the pro-nuclear power faction should increase further. "The image of horror pales before logic," commented the "HAMBURG ABENDBLATT" on the reassuring study which was completed after 3 years of work.

Four and one-half months after the near-catastrophe at the American Three Mile Island Nuclear Power Plant, the Menetekel of Harrisburg has paled into meaninglessness. Radioactivity in the reinforced concrete container is indeed still so high that it can only be entered for several minutes with protective clothing; and only after 1-1/2 to 2 years will the radiation in the steel reactor-pressure vessel decay so much that the damage in the reactor core can be viewed.

But the nuclear lobby is already busy promoting the Harrisburg accident almost as a demonstration of the safety of nuclear reactors. American energy politician and member of congress Mike McCormack evaluated the accident in Harrisburg to the Berlin congress as a "core melt of part of the press and electronic media." No one was harmed and "the plant would have protected the public against an even worse accident if it had come to this."

For the faith-healers gathered in Berlin who tried to surmount the minor accident of Harrisburg so quickly, the "German Risk Study" published in Berlin came just at the right moment: It reads like an all-clear-signal issued in the name of science.

Analogous to the legendary "Reactor Safety Study" presented in 1975 by U.S. scientist Norman Carl Rasmussen, the German analysis of danger came to the conclusion that the population is subject to almost no risk from nuclear power plants.

For each individual citizen, explained Professor Adolf Birkhofer, director of the Cologne Society for Reactor Safety (GRS) and coordinator of the study, the danger of dying in a traffic accident is about 1,000 times greater than the risk of dying in a nuclear accident.

A "melt-down," the melting of a reactor core, can be expected only one in 10,000 years of reactor operation, but serious consequences to the population would only occur in every hundredth nuclear melt accident. The worst imaginable reactor accident--14,500 immediate dead and 104,000 other dead in the following 30 years--can, according to the GRS study, occur at most once in 2 billion years per reactor.

In spite of all criticism directed in recent years against the Rasmussen study (some of which has been accepted in the meantime by Rasmussen), the German risk calculators not only relied expressly on the methods of the American; they limit themselves, like Rasmussen, solely to nuclear melt accidents in their calculation and leave out a number of potential causes of catastrophe:

For example, accidents due to war, sabotage and terrorism were left out of consideration; natural events like floods, earthquakes or lightning were considered only on the periphery;

Human failure of the operating personnel was included in the calculations only inasmuch as it related to technical intervention as provided for in the nuclear power plant operating handbooks;

Even though individual aircraft have crashed dangerously close to nuclear power plants, the GRS study omits any "detailed analyses" of air traffic. The reason: "No notable contribution to the total risk";

In spite of the certain knowledge that the FRG is at best inadequately prepared for catastrophe, the study proceeds on the assumption that for all accidents the affected regions can be evacuated within 8 hours.

The study is not even founded on hard facts regarding technical reliability at the power plants. In testing reactor components the accident researchers used "data which was often determined not for the actual component, but for components of similar design operating under similar employment conditions." In addition, the GRS researchers considered it to be "unnecessary" to fully record and evaluate realistic reactor failures.

At the conclusion, the authors permit the result of their risk calculation to evaporate. Based on experiences of 1,500 reactor-years of operation worldwide, they consider it nevertheless somewhat useless to make "more or less reliable" prognoses "for occurrences with probabilities of one in one billion per year." It is "questionable whether occurrences with the named or even smaller frequency can be included at all in real considerations."

But in the political sphere: Research Minister Hauff could find "no reasons" in the calculations of the risk study "to have to change my positive attitude toward the peaceful use of nuclear energy."

Criticism of Study

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[Article by Wolfgang Barthel: "An Expert Opinion Which Is Supposed To Lull the Public"]

> [Text] The chances of winning the main prize in a lottery is 100 times greater than the danger of a nuclear reactor melting down and killing 120,000 people in the Federal Republic--according to the reassuring results of a risk study by the Research Ministry. But the truth looks somewhat different. The experts paid no attention to serious sources of danger and even overlooked their own background documents.

Federal Research Minister Volker Hauff is satisfied. The SPD politician sees "no reasons to have to change my positive attitude toward the peaceful use of nuclear energy." The 39-year-old minister bases his optimism on a 48-page paper which he presented last Tuesday to journalists in Bonn. In a "German Risk Study" the Cologne Society for Reactor Safety (GRS) came to the conclusion that in case of an atomic catastrophe, up to 14,500 would be killed immediately and another 104,000 would die over the long term. At the same time, the Cologne scientists remarked reassuringly that such an event would be expected only once in 2 billion years. Hauff added hopefully: Now Germans can finally reflect on their nuclear energy future "without having to underestimate or dramatize."

Nuclear advocate Hauff should give more thought to his inspectors, because the technicians engaged by him cannot make independent decisions.

The 400 GRS scientists prepare expert opinions under contract for everyone who is prepared to pay between DM 91 and 95 per hour plus value-added tax and secondary costs: for the Interior Ministry, for the nuclear industry, for the electric power generators and for nuclear power plants in South Africa being built under contract to and at the expense of Kraftwerk Union (KWU). For the FRG Ministry of the Interior alone, the GRS inspectors have worked for 166,600 hours this year, according to estimates, and will receive DM 20 million for this.

In order that the connection with the ministries run smoothly, GRS chiefs Otto Kellermann and Adolf Birkhofer were also employed by the Reactor Safety Commission (RSK) at the Federal Ministry of the Interior. The safety guidelines for our nuclear power plants are established there, predominantly on the basis of GRS opinions. Thus, Kellermann and Birkhofer are permitted to issue an expert opinion on their own expert opinion. Both of these gentlemen have made names for themselves in the past as nuclear power proponents.

For instance, on 15 November 1978 Kellermann wrote to North Rhine-Westfalia's Economics Minister Horst-Ludwig Riemer that "an excess of safety devices...could definitely be an obstacle to better operation of a plant and its availability." Two years before this, and thus before beginning work on the risk study, Kellermann had already declared: "The residual risk for nuclear power plants is so small that it can be accepted by everyone without danger." And furthermore: "Nuclear power plants as terrifying ghosts of radioactive poisoning exist only in the heads of fanaticized environmentalists who hardly have access to factual arguments and who have been incorrectly programmed."

Experts Who Check Their Own Safety Criteria

Considering such obvious partisanship in favor of the nuclear industry, it appears doubtful that the GRS is suitable as a neutral expert on a risk study. Even the subcontractor inspectors invited to participate with the GRS are not entirely independent; for example, the Nuclear Research Center in Karlsruhe, the Society for Radiation and Environmental Research or Nuclear Technology-West, a working association of the TUEV [Technical Inspection Administration]. The Stuttgart Material Testing Institute has been testing pipe systems and reactor pressure vessels for many years and was used for the risk study expressly for a safety evaluation of the pressure vessel; thus, they were checking their own safety criteria. The fact that the only result was the relative safety of nuclear power will not be surprising to anyone.

The GRS would have done better to use the documents of the Reactor Safety Commission (RSK) for a safety evaluation because detailed records on all problems occurring in connection with nuclear energy are compiled there and binding safety guidelines issued. All accidents and malfunctions are evaluated by the RSK--a wealth of material to which the GRS

directors have access at any time. Found in the RSK files, for example, is the report on the Obringheim Nuclear Power Plant, the first commercial pressurized water reactor in the Federal Republic, which has been operating at a power output of 330 megawatts since 1969. The judgment is disastrous. The RSK subcommittee on pressurized water reactors confirmed "significant deviations from the present normal safety standard," and the criticism reads as follows:

"1. The plant is not designed to withstand severe external effects. Some improvement can be achieved by constructing an emergency system with additional emergency observation towers.

"2. The plant is not designed to withstand severe internal damage. Isolated improvements can be achieved here; for example, reinforcing the emergency cooling system through the installation of pressure reservoirs, but the occurring radiation and reaction forces cannot be eliminated.... In the event of a rupture in the fresh steam line, damage to containment may occur if the rupture is in an unfavorable position...." The results of the subcommittee were not published, in contrast to the reassuring risk study.

Thus, the list of deficiencies Obringheim's still has not come to an end because the reactor pressure vessel now exhibits clear signs of aging after 10 years of operation. Due to constant bombardment by electrons, the welded seams have become brittle so that the reactor can only be operated at low power levels. Naturally there is no talk of a shutdown, and even the inhabitants around the reactor were not informed of the danger. However, the "reduction in strength of the weld metal caused by the copper content," according to the RSK record, can already have caused cracks up to 1/4 of the wall thickness. The 630-megawatt reactor near Stade which was out into operation in 1962 on the Elbe River has also become so brittle that it will only be able to deliver power for between 10-20 years instead of the expected service life of 30 to 40 years.

Damage Frequently Occurs Before Initial Operation of the Plant

In addition, the neighbors of other German nuclear power plants would have little cause to sleep soundly if they were not lulled by reassuring risk calculations but were instead presented with the RSK documents. The Muelheim-Kaerlich reactor on the bank of the Rhine River between Koblenz and Bonn, which is generally the same in design as the unfortunate Harrisburg Plant, is already causing its operators considerable concern even prior to beginning operations. According to the RSK inspectors, "densely packed slag occlusions were found over considerable lengths of welded seam" in the reactor pressure vessel." The cracks were up to 2.2 meters long and up to 23 centimeters deep. To be sure, the faults were corrected, but the quality of the pressure vessel had suffered. Said the inspector: "In the fault correction an attempt was made to retain the advantages of the close-crevice welding used by the pressure vessel manufacturer; however, this was not possible at all points."

It is no better elsewhere. In the Krummel boiling water reactor on the upper Elbe River, the RSK made the following determinations on the as yet unfinished sheet metal supports of the safety containment: "The design is not in accordance with the high stresses to be placed on the quality of the containment." In the Isar Nuclear Power Plant, "crack formations up to a length of 40 mm in the direction of the seam" were found on round seams; in addition, there were particularly dangerous "cracks in both emergency injection lines." In the superheater-condensate system alone, 45 of 216 welded seams exhibited damage.

For the Philippsburg Nuclear Power Plant--which was delayed for several years because of the required replacement of various pipelines--only temporary operation was approved after the discovery of new deficiencies in the relief and auxiliary steam lines. In Biblis, the feedwater vessel was cracked at several places. In the Gundremmingen Power Plant--which has been shut down since 1977 after a series of failures--various cracks were discovered in the pressure vessel and in the pipelines. Two workers died there from scalding by radioactive steam. Renewed operation is possible only "after approval of the entire reinforcement catalog." This had apparently been the procedural case beforehand as well.

Such examples do indeed indicate how pitiful the control of our nuclear power plants is. Actually, in no branch of the economy except perhaps for Lufthansa, are the systems monitored as thoroughly as those of nuclear power. On the other hand, the GRS and power plant builders and operators--who were allowed to work on the study in spite of their partisanship--have simply excluded a whole series of potential dangers.

"Contributions to risk due to such possibilities as war, terrorism and sabotage were not discussed," reads the terse statement of results, and even earthquakes, lightning strikes, flood-water or the crash of an aircraft on a nuclear power plant were not included.

It may be that the inspectors do not estimate such risks very highly. But even human error was not taken very seriously. "Cases in which human error leads to the failure of systems are relatively easy to find," wrote the GRS specialists in their study, and continue expressly: "Unplanned interference--has not yet been quantified."

Perhaps they would have more to say on this point if they had read more about the analysis of the Brunsbuettel reactor accident of 18 June 1978 in the confidential RSK records. At that time the operating personnel shut off the automatic reactor shutdown contrary to regulations, even though 145 tons of radioactive steam got into the engineroom through a leak and from there was partially ejected through the smokestack and air valves into the environment. The shift chief had initiated the prohibited interference in order to save his company millions in losses, because for each rapid shutdown, a great deal of radioactivity is released. Since in Brunsbuettel a good number of things were always going wrong anyway, and the reactor often had to be shut down, the permissible maximum

annual values had almost been reached as early as June. Another fast shutdown had to be prevented at all costs in the opinion of the operating crew--even at the cost of a radioactive discharge into the environment.

Faults in Design and Monitoring

Even though the accident released much more radioactivity than the authorities would like to admit, nothing was done to provide more safety against such interfence. We quote the RSK record after an inspection of the Neckar and Philippsburg I nuclear power plants: "Instances of unauthorized interference by trained personnel in the safety system are possible as the result of inattention or through exceeding administrative measures. In other words: Everything remains the same.

The RSK record on the causes of the Brunsbuettel accident is also important to the safety philosophy of German power plant builders and their official monitoring authorities. Here we read: "On the basis of the appearance of the break at the support...the inspector concluded that the break was caused by vibration stresses." As a potential cause the inspectors considered "pressure fluctuations in the outlet area of the throttle valves." The RSK: "In connection with inappropriate material processing (turning tool marks and grinding traces), this could lead to a leak with subsequent forced ductile break. The RSK discussed the repair solution or changes suggested by the manufacturer, whereby basic improvements in design details were suggested. The evaluation of the final repair solution must be performed by experts. The RSK assumes that supports in other power plants, where similar damage could occur due to their locations and stresses, were reinforced."

Much is notable about this record. In the first place, there must have been an improper design of the support, because otherwise "basic improvements in design details" would not be necessary. Secondly, the citizenry would be quite interested to know which inspector had approved the adequate supports and whether appropriate personnel consequences were drawn; that is, whether this inspector is still employed by the RSK and the nuclear industry as an expert.

In the third place, the support was apparently manufactured in a defective manner and yet was still installed, because we read expressly of "improper material processing." Fourthly, the same manufacturer was still permitted to deliver the new supports. Finally, we determine that the same supports, probably with the same sloppy processing, have also been installed in other nuclear power plants. In other words: Brunsbuttel can be repeated anywhere at any time.

We read nothing of all this in Hauff's study, although the inspectors do concede: "Risk analyses have only limited validity given the present status of knowledge."

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